City of Redlands

Municipal Utilities and Engineering Department

RECEIVED
JUN 16 2011
SAN BERNARDINO ASSOCIATED GOVTS

June 14, 2011

Ryan Graham
San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino CA 92410-1715

Congestion Management Plan Level of Service Analysis for 2011

Enclosed please find the required 2011 level of service analysis updates for the following CMP intersections:

1. Mt. View Avenue and San Bernardino Avenue.
2. Redlands Boulevard and Ford Street.

If you have any questions, please call Art Creef at (909)798-7585, xt.5.

ART CREEF
Associate Engineer
Municipal Utilites and Engineering Department
35 Cajon Street
Redlands, CA 92373

ac

FILE: CMP LOS 2011

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

May 24. 2011

Mt. View Ave. & San Bernardino Ave. **City of Redlands** **AM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	L	T	R	*L*	*T*	R	*L*	T	*R*	L	T	R
Movement 1: 10 secs	X			X								
Movement 2: 26 secs		X	X		X	X						
Movement 3: 13 secs							X			X		
Movement 4: 17 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	S	1	2	1	1	1	1	1	1	1
Unadjusted Volume	1	167	74	83	341	11	137	25	107	3	12	1
Peak Hour Factor (PHF)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd									
Min. Time or Ped. Time	10	22	22	10	26	26	10	17	17	10	15	15
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	1.00	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

				***	***		***		***			
Pk. Hr. Vol. (vph)	10	186	82	92	379	12	152	28	119	10	13	10
Saturation Flow (vph)	1700	3600	Shrd	1700	3600	1800	1700	1800	1800	1700	1800	1800
X or V/C	0.05	0.20	-	0.45	0.29	0.02	0.54	0.07	0.29	0.04	0.03	0.02
Effective green (sec)	8	24	-	8	24	24	11	15	15	11	15	15
Split Time (sec)	10	26	-	10	26	26	13	17	17	13	17	17
Min. Time or Ped. Time (sec)	10	22	-	10	26	26	10	17	17	10	15	15
Delay - 15 min pk (sec/veh)	26	15	-	34	15	14	32	20	23	23	20	20
Level of Service (LOS)	C	B	-	C-	B	B	C-	C+	C+	C+	B	B
Average 'Q' (veh/ln)	1	2	-	2	2	1	2	1	2	1	1	1
Design 'Q'- ft/ln	40	60	-	60	60	40	60	40	60	40	40	40
Do Vehicles Clear?	YES	YES	-	YES	YES	YES	YES	YES	YES	YES	YES	YES

Summary

Whole Intersection

Weighted Avg Delay (sec) = 20
Level of Service - LOS = C+

Critical Movements

Weighted Avg Delay (sec) = 22
Level of Service - LOS = C+
Intersection Capacity Utilization - ICU = 0.36

Required Cycle Length is 66 sec

Min./Ped. Times Satisfied

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Redlands
N/S: Mountain Avenue
E/W: San Bernardino Avenue
Weather: Sunny

File Name : REDMOSBAM
Site Code : 11136159
Start Date : 5/24/2011
Page No : 1

Groups Printed- Total Volume

	Mountain Avenue Southbound				San Bernardino Avenue Westbound				Mountain Avenue Northbound				San Bernardino Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	5	1	7	15	63	1	79	36	9	43	88	0	39	9	48	222
07:15 AM	0	4	0	4	18	69	2	89	41	10	17	68	1	49	27	77	238
07:30 AM	1	2	0	3	19	109	5	133	31	2	24	57	0	38	18	56	249
07:45 AM	1	1	0	2	31	100	3	134	29	4	23	56	0	41	20	61	253
Total	3	12	1	16	83	341	11	435	137	25	107	269	1	167	74	242	962
08:00 AM	1	1	0	2	20	80	1	101	35	6	13	54	1	44	19	64	221
08:15 AM	0	0	1	1	13	56	4	73	23	2	12	37	0	38	9	47	158
08:30 AM	2	3	1	6	16	45	1	62	20	4	13	37	0	31	12	43	148
08:45 AM	0	3	0	3	21	47	4	72	17	6	17	40	0	38	13	51	166
Total	3	7	2	12	70	228	10	308	95	18	55	168	1	151	53	205	693
Grand Total	6	19	3	28	153	569	21	743	232	43	162	437	2	318	127	447	1655
Apprch %	21.4	67.9	10.7		20.6	76.6	2.8		53.1	9.8	37.1		0.4	71.1	28.4		
Total %	0.4	1.1	0.2	1.7	9.2	34.4	1.3	44.9	14	2.6	9.8	26.4	0.1	19.2	7.7	27	

	Mountain Avenue Southbound				San Bernardino Avenue Westbound				Mountain Avenue Northbound				San Bernardino Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**1**	**5**	**1**	**7**	15	63	1	79	36	9	**43**	**88**	0	39	9	48	222
07:15 AM	0	4	0	4	18	69	2	89	**41**	**10**	17	68	**1**	**49**	**27**	**77**	238
07:30 AM	1	2	0	3	19	**109**	**5**	133	31	2	24	57	0	38	18	56	249
07:45 AM	1	1	0	2	**31**	100	3	**134**	29	4	23	56	0	41	20	61	**253**
Total Volume	3	12	1	16	83	341	11	435	137	25	107	269	1	167	74	242	962
% App. Total	18.8	75	6.2		19.1	78.4	2.5		50.9	9.3	39.8		0.4	69	30.6		
PHF	.750	.600	.250	.571	.669	.782	.550	.812	.835	.625	.622	.764	.250	.852	.685	.786	.951

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City of Redlands
N/S: Mountain Avenue
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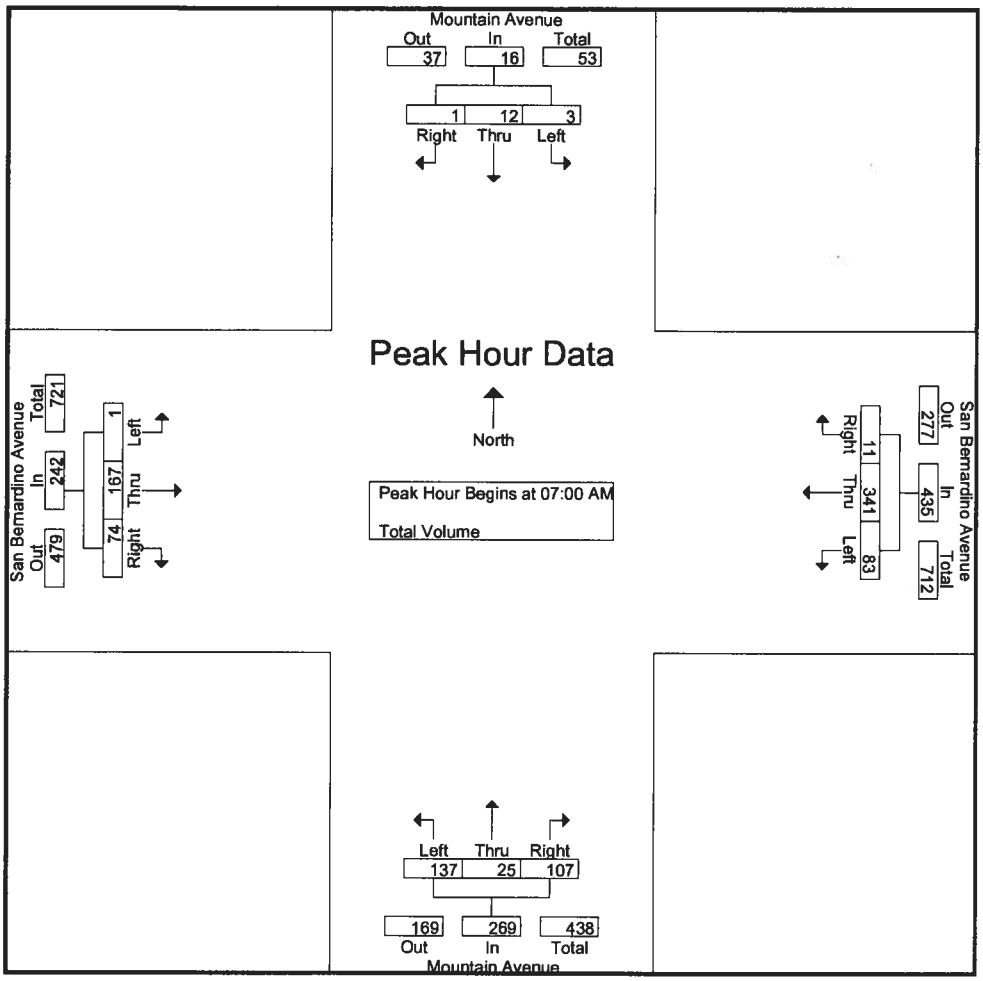
File Name : REDMOSBAM
Site Code : 11136159
Start Date : 5/24/2011
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			S	07:15 AM			W	07:00 AM			N	07:15 AM			E
+0 mins.	**1**	**5**	**1**	**7**	18	69	2	89	36	9	**43**	**88**	**1**	**49**	**27**	**77**
+15 mins.	0	4	0	4	19	**109**	**5**	133	**41**	**10**	17	68	0	38	18	56
+30 mins.	1	2	0	3	**31**	100	3	**134**	31	2	24	57	0	41	20	61
+45 mins.	1	1	0	2	20	80	1	101	29	4	23	56	1	44	19	64
Total Volume	3	12	1	16	88	358	11	457	137	25	107	269	2	172	84	258
% App. Total	18.8	75	6.2		19.3	78.3	2.4		50.9	9.3	39.8		0.8	66.7	32.6	
PHF	.750	.600	.250	.571	.710	.821	.550	.853	.835	.625	.622	.764	.500	.878	.778	.838

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Mt. View Ave. & San Bernardino Ave.

Mt. View Ave. & San Bernardino Ave. **City of Redlands** **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	L	*T*	R	*L*	T	R	*L*	T	*R*	L	T	R
Movement 1: 10 secs	X			X								
Movement 2: 26 secs		X	X		X	X						
Movement 3: 11 secs							X			X		
Movement 4: 17 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	S	1	2	1	1	1	1	1	1	1
Unadjusted Volume	2	553	151	109	229	5	124	18	99	13	24	7
Peak Hour Factor (PHF)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd									
Min. Time or Ped. Time	10	22	22	10	26	26	10	17	17	10	15	15
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	1.00	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

		***		***			***		***			
Pk. Hr. Vol. (vph)	10	614	168	121	254	10	138	20	110	14	27	10
Saturation Flow (vph)	1700	3600	Shrd	1700	3600	1800	1700	1800	1800	1700	1800	1800
X or V/C	0.05	0.58	-	0.57	0.19	0.01	0.58	0.05	0.26	0.06	0.06	0.02
Effective green (sec)	8	24	-	8	24	24	9	15	15	9	15	15
Split Time (sec)	10	26	-	10	26	26	11	17	17	11	17	17
Min. Time or Ped. Time (sec)	10	22	-	10	26	26	10	17	17	10	15	15
Delay - 15 min pk (sec/veh)	25	18	-	37	14	13	35	19	21	24	19	19
Level of Service (LOS)	C	B	-	D+	B	B	D+	B	C+	C+	B	B
Average 'Q' (veh/ln)	1	4	-	2	1	1	2	1	1	1	1	1
Design 'Q'- ft/ln	40	120	-	60	40	40	60	40	40	40	40	40
Do Vehicles Clear?	YES	YES	-	YES	YES	YES	YES	YES	YES	YES	YES	YES

Summary

Whole Intersection

Weighted Avg Delay (sec) = 21
Level of Service - LOS = C+

Critical Movements

Weighted Avg Delay (sec) = 22
Level of Service - LOS = C+
Intersection Capacity Utilization - ICU = 0.49

Required Cycle Length is 64 sec

Min./Ped. Times Satisfied

Counts Unlimited, Inc.
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Corona, CA 92878
(951) 268-6268

City of Redlands
N/S: Mountain Avenue
E/W: San Bernardino Avenue
Weather: Sunny

File Name : REDMOSBPM
Site Code : 11136159
Start Date : 5/24/2011
Page No : 1

Groups Printed- Total Volume

	Mountain Avenue Southbound				San Bernardino Avenue Westbound				Mountain Avenue Northbound				San Bernardino Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	3	15	0	18	23	50	1	74	30	1	18	49	0	99	25	124	265
04:15 PM	2	10	0	12	23	75	0	98	19	1	14	34	3	100	28	131	275
04:30 PM	2	4	2	8	33	75	1	109	30	0	23	53	2	120	31	153	323
04:45 PM	4	5	0	9	28	62	0	90	28	4	26	58	0	109	41	150	307
Total	11	34	2	47	107	262	2	371	107	6	81	194	5	428	125	558	1170
05:00 PM	7	9	2	18	23	38	3	64	31	7	24	62	0	128	43	171	315
05:15 PM	0	6	3	9	25	54	1	80	35	7	26	68	0	196	36	232	389
05:30 PM	0	5	1	6	13	40	1	54	27	1	18	46	1	127	30	158	264
05:45 PM	2	4	0	6	11	34	2	47	20	3	17	40	0	107	26	133	226
Total	9	24	6	39	72	166	7	245	113	18	85	216	1	558	135	694	1194
Grand Total	20	58	8	86	179	428	9	616	220	24	166	410	6	986	260	1252	2364
Apprch %	23.3	67.4	9.3		29.1	69.5	1.5		53.7	5.9	40.5		0.5	78.8	20.8		
Total %	0.8	2.5	0.3	3.6	7.6	18.1	0.4	26.1	9.3	1	7	17.3	0.3	41.7	11	53	

	Mountain Avenue Southbound				San Bernardino Avenue Westbound				Mountain Avenue Northbound				San Bernardino Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	2	4	2	8	**33**	**75**	1	**109**	30	0	23	53	**2**	120	31	153	323
04:45 PM	4	5	0	9	28	62	0	90	28	4	**26**	58	0	109	41	150	307
05:00 PM	**7**	**9**	2	**18**	23	38	**3**	64	31	**7**	24	62	0	128	**43**	171	315
05:15 PM	0	6	**3**	9	25	54	1	80	**35**	7	26	**68**	0	**196**	36	**232**	**389**
Total Volume	13	24	7	44	109	229	5	343	124	18	99	241	2	553	151	706	1334
% App. Total	29.5	54.5	15.9		31.8	66.8	1.5		51.5	7.5	41.1		0.3	78.3	21.4		
PHF	.464	.667	.583	.611	.826	.763	.417	.787	.886	.643	.952	.886	.250	.705	.878	.761	.857

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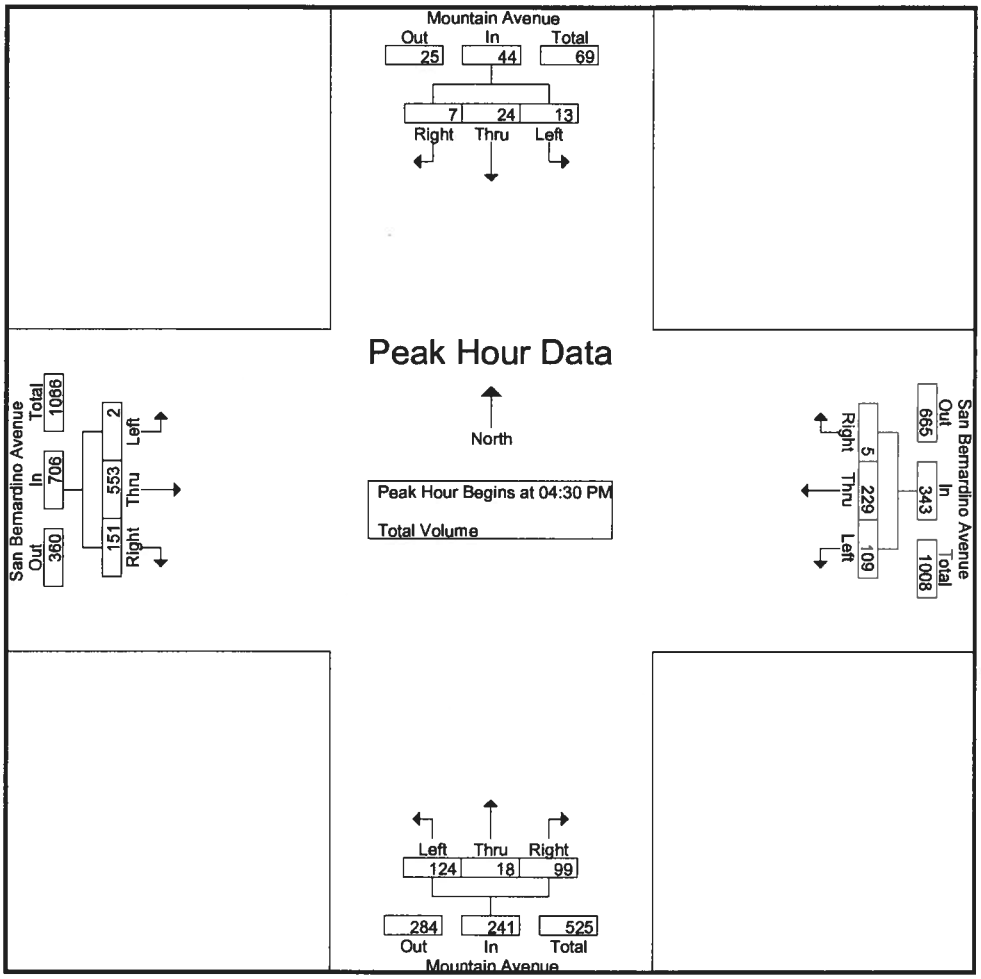
City of Redlands
N/S: Mountain Avenue
E/W: San Bernardino Avenue
Weather: Sunny

File Name : REDMOSBPM
Site Code : 11136159
Start Date : 5/24/2011
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:30 PM				04:45 PM			
+0 mins.	3	**15**	0	**18**	23	50	**1**	74	30	0	23	53	0	109	41	150
+15 mins.	2	10	0	12	23	**75**	0	98	28	4	**26**	58	0	128	**43**	171
+30 mins.	2	4	**2**	8	**33**	75	1	**109**	31	**7**	24	62	0	**196**	36	**232**
+45 mins.	**4**	5	0	9	28	62	0	90	**35**	7	26	**68**	**1**	127	30	158
Total Volume	11	34	2	47	107	262	2	371	124	18	99	241	1	560	150	711
% App. Total	23.4	72.3	4.3		28.8	70.6	0.5		51.5	7.5	41.1		0.1	78.8	21.1	
PHF	.688	.567	.250	.653	.811	.873	.500	.851	.886	.643	.952	.886	.250	.714	.872	.766

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

May 25, 2011

Redlands Blvd. & Ford St. **City of Redlands** **AM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	R	L	*T*	R	L	*T*	R	L	T	R
Movement 1: 11 secs	X			X								
Movement 2: 12 secs		X	X		X	X						
Movement 3: 16 secs							X	X	X	X	X	X
Movement 4: 0 secs												
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	S	1	2	S	1	2	S	1	2	S
Unadjusted Volume	112	168	57	44	219	36	99	500	48	114	236	78
Peak Hour Factor (PHF)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	11	12	12	11	12	12	12	12	12	12	12	12
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	1.00	1.00	-	1.00	1.00	-	1.00	1.00	-	1.00	1.00	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***				***			***				
Pk. Hr. Vol. (vph)	112	168	57	44	219	36	99	500	48	114	236	78
Saturation Flow (vph)	1700	3600	Shrd	1700	3600	Shrd	1000	3600	Shrd	800	3600	Shrd
X or V/C	0.29	0.24	-	0.11	0.28	-	0.28	0.42	-	0.40	0.24	-
Effective green (sec)	9	10	-	9	10	-	14	14	-	14	14	-
Split Time (sec)	11	12	-	11	12	-	16	16	-	16	16	-
Min. Time or Ped. Time (sec)	11	12	-	11	12	-	12	12	-	12	12	-
Delay - 15 min pk (sec/veh)	14	12	-	12	12	-	11	10	-	13	9	-
Level of Service (LOS)	B	B	-	B	B	-	B	B	-	B	A	-
Average 'Q' (veh/ln)	1	1	-	1	1	-	1	2	-	1	1	-
Design 'Q'- ft/ln	40	40	-	40	40	-	40	60	-	40	40	-
Do Vehicles Clear?	YES	YES	-	YES	YES	-	YES	YES	-	YES	YES	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 11
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 11
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.34

Required Cycle Length is 39 sec

Min./Ped. Times Satisfied

Counts Unlimited, Inc.
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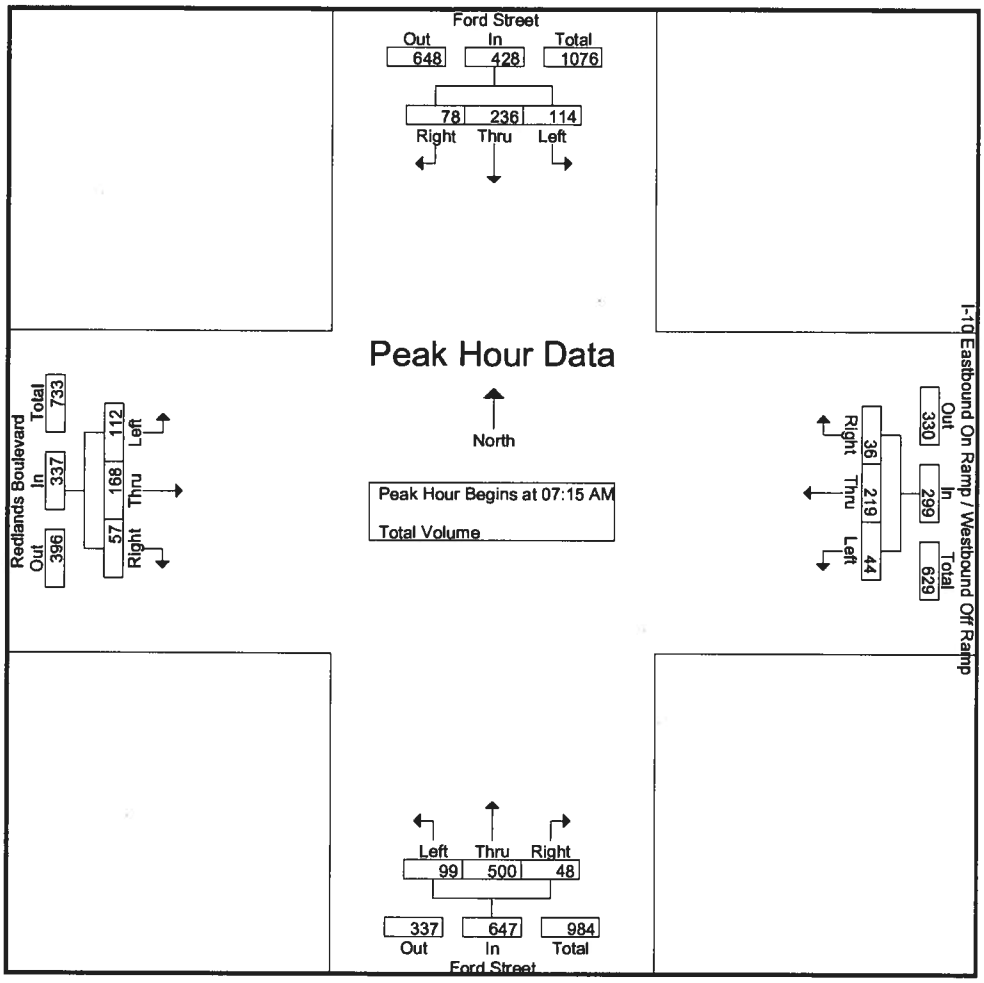
Corona, CA 92878
(951) 268-6268

City of Redlands
N/S: Ford Street
E/W: Redlands Boulevard
Weather: Sunny

File Name : REDFOREAM
Site Code : 11136009
Start Date : 5/25/2011
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM			S	08:00 AM			W	07:15 AM			N	07:15 AM			E
+0 mins.	**32**	41	18	91	9	54	5	68	30	112	11	153	31	34	11	76
+15 mins.	30	75	20	**125**	6	53	12	71	12	132	12	156	24	39	**21**	84
+30 mins.	30	**76**	16	122	11	53	**16**	80	22	**148**	11	**181**	**32**	**58**	14	**104**
+45 mins.	22	44	**24**	90	**18**	**61**	13	**92**	**35**	108	**14**	157	25	37	11	73
Total Volume	114	236	78	428	44	221	46	311	99	500	48	647	112	168	57	337
% App. Total	26.6	55.1	18.2		14.1	71.1	14.8		15.3	77.3	7.4		33.2	49.9	16.9	
PHF	.891	.776	.813	.856	.611	.906	.719	.845	.707	.845	.857	.894	.875	.724	.679	.810

Counts Unlimited, Inc.
PO Box 1178
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(951) 268-6268

City of Redlands
N/S: Ford Street
E/W: Redlands Boulevard
Weather: Sunny

File Name : REDFOREAM
Site Code : 11136009
Start Date : 5/25/2011
Page No : 1

Groups Printed- Total Volume

	Ford Street Southbound				I-10 Eastbound On Ramp / Westbound Off Ramp Westbound				Ford Street Northbound				Redlands Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	24	27	19	70	4	51	10	65	21	119	13	153	33	21	12	66	354
07:15 AM	32	41	18	91	10	53	8	71	30	112	11	153	31	34	11	76	391
07:30 AM	30	75	20	125	8	54	13	75	12	132	12	156	24	39	21	84	440
07:45 AM	30	76	16	122	17	58	10	85	22	148	11	181	32	58	14	104	492
Total	116	219	73	408	39	216	41	296	85	511	47	643	120	152	58	330	1677
08:00 AM	22	44	24	90	9	54	5	68	35	108	14	157	25	37	11	73	388
08:15 AM	19	49	14	82	6	53	12	71	12	90	5	107	25	32	19	76	336
08:30 AM	19	55	15	89	11	53	16	80	20	94	8	122	27	36	11	74	365
08:45 AM	17	49	25	91	18	61	13	92	11	71	4	86	22	42	9	73	342
Total	77	197	78	352	44	221	46	311	78	363	31	472	99	147	50	296	1431
Grand Total	193	416	151	760	83	437	87	607	163	874	78	1115	219	299	108	626	3108
Apprch %	25.4	54.7	19.9		13.7	72	14.3		14.6	78.4	7		35	47.8	17.3		
Total %	6.2	13.4	4.9	24.5	2.7	14.1	2.8	19.5	5.2	28.1	2.5	35.9	7	9.6	3.5	20.1	

	Ford Street Southbound				I-10 Eastbound On Ramp / Westbound Off Ramp Westbound				Ford Street Northbound				Redlands Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**32**	41	18	91	10	53	8	71	30	112	11	153	31	34	11	76	391
07:30 AM	30	75	20	**125**	8	54	**13**	75	12	132	12	156	24	39	**21**	84	440
07:45 AM	30	**76**	16	122	**17**	**58**	10	**85**	22	**148**	11	**181**	**32**	**58**	14	**104**	**492**
08:00 AM	22	44	**24**	90	9	54	5	68	**35**	108	**14**	157	25	37	11	73	388
Total Volume	114	236	78	428	44	219	36	299	99	500	48	647	112	168	57	337	1711
% App. Total	26.6	55.1	18.2		14.7	73.2	12		15.3	77.3	7.4		33.2	49.9	16.9		
PHF	.891	.776	.813	.856	.647	.944	.692	.879	.707	.845	.857	.894	.875	.724	.679	.810	.869

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

May 25, 2011

Redlands Blvd. & Ford St. **City of Redlands** **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	L	T	R	L	*T*	R
Movement 1: 11 secs	X			X								
Movement 2: 12 secs		X	X		X	X						
Movement 3: 12 secs							X	X	X	X	X	X
Movement 4: 0 secs												
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	S	1	2	S	1	2	S	1	2	S
Unadjusted Volume	160	450	113	32	146	102	70	252	39	67	340	120
Peak Hour Factor (PHF)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	11	12	12	11	12	12	12	12	12	12	12	12
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	1.00	1.00	-	1.00	1.00	-	1.00	1.00	-	1.00	1.00	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***	***									***	
Pk. Hr. Vol. (vph)	160	450	113	32	146	102	70	252	39	67	340	120
Saturation Flow (vph)	1700	3600	Shrd	1700	3600	Shrd	900	3600	Shrd	1000	3600	Shrd
X or V/C	0.37	0.55	-	0.07	0.24	-	0.27	0.28	-	0.23	0.45	-
Effective green (sec)	9	10	-	9	10	-	10	10	-	10	10	-
Split Time (sec)	11	12	-	11	12	-	12	12	-	12	12	-
Min. Time or Ped. Time (sec)	11	12	-	11	12	-	12	12	-	12	12	-
Delay - 15 min pk (sec/veh)	13	13	-	10	10	-	12	10	-	11	12	-
Level of Service (LOS)	B	B	-	B	B	-	B	B	-	B	B	-
Average 'Q' (veh/ln)	1	2	-	1	1	-	1	1	-	1	2	-
Design 'Q'- ft/ln	40	60	-	40	40	-	40	40	-	40	60	-
Do Vehicles Clear?	YES	YES	-	YES	YES	-	YES	YES	-	YES	YES	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 12
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 12
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.46

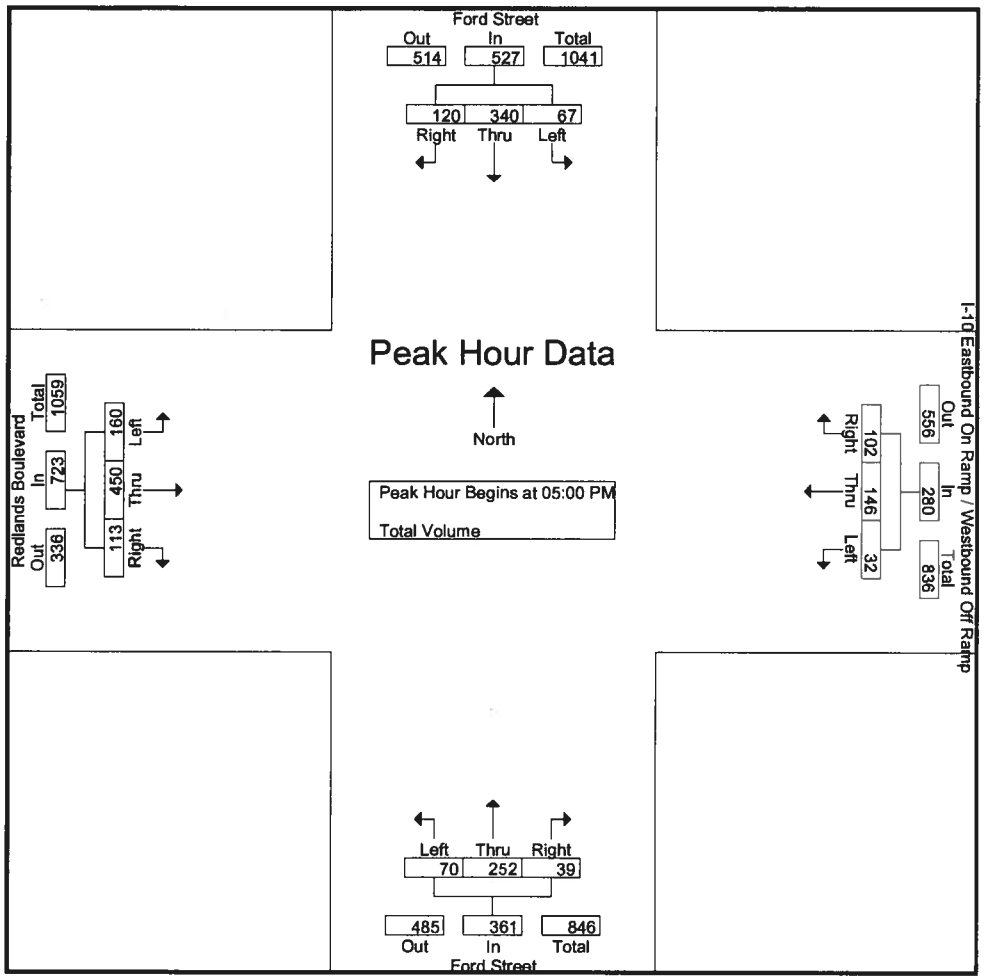
Required Cycle Length Is 35 sec

Min./Ped. Times Satisfied

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Redlands
N/S: Ford Street
E/W: Redlands Boulevard
Weather: Sunny

File Name : REDFOREPM
Site Code : 11136009
Start Date : 5/25/2011
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM			S	05:00 PM			W	05:00 PM			N	05:00 PM			E
+0 mins.	28	86	22	136	8	**38**	**31**	**77**	22	68	8	98	40	100	21	161
+15 mins.	**33**	**92**	27	**152**	8	37	23	68	15	50	4	69	38	**129**	24	191
+30 mins.	28	80	30	138	5	34	20	59	10	61	**15**	86	**46**	116	**42**	**204**
+45 mins.	4	88	**33**	125	**11**	37	28	76	**23**	**73**	12	**108**	36	105	26	167
Total Volume	93	346	112	551	32	146	102	280	70	252	39	361	160	450	113	723
% App. Total	16.9	62.8	20.3		11.4	52.1	36.4		19.4	69.8	10.8		22.1	62.2	15.6	
PHF	.705	.940	.848	.906	.727	.961	.823	.909	.761	.863	.650	.836	.870	.872	.673	.886

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N/S: Ford Street
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Page No : 1

Groups Printed- Total Volume

	Ford Street Southbound				I-10 Eastbound On Ramp / Westbound Off Ramp Westbound				Ford Street Northbound				Redlands Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	22	60	15	97	8	33	14	55	15	65	12	92	23	118	28	169	413
04:15 PM	28	63	24	115	6	27	24	57	21	56	11	88	45	104	31	180	440
04:30 PM	19	59	23	101	4	37	26	67	11	60	10	81	24	98	26	148	397
04:45 PM	28	86	22	136	6	27	34	67	15	49	17	81	27	110	23	160	444
Total	97	268	84	449	24	124	98	246	62	230	50	342	119	430	108	657	1694
05:00 PM	33	92	27	152	8	38	31	77	22	68	8	98	40	100	21	161	488
05:15 PM	28	80	30	138	8	37	23	68	15	50	4	69	38	129	24	191	466
05:30 PM	4	88	33	125	5	34	20	59	10	61	15	86	46	116	42	204	474
05:45 PM	2	80	30	112	11	37	28	76	23	73	12	108	36	105	26	167	463
Total	67	340	120	527	32	146	102	280	70	252	39	361	160	450	113	723	1891
Grand Total	164	608	204	976	56	270	200	526	132	482	89	703	279	880	221	1380	3585
Apprch %	16.8	62.3	20.9		10.6	51.3	38		18.8	68.6	12.7		20.2	63.8	16		
Total %	4.6	17	5.7	27.2	1.6	7.5	5.6	14.7	3.7	13.4	2.5	19.6	7.8	24.5	6.2	38.5	

	Ford Street Southbound				I-10 Eastbound On Ramp / Westbound Off Ramp Westbound				Ford Street Northbound				Redlands Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**33**	**92**	27	**152**	8	**38**	**31**	**77**	22	68	8	98	40	100	21	161	**488**
05:15 PM	28	80	30	138	8	37	23	68	15	50	4	69	38	**129**	24	191	466
05:30 PM	4	88	**33**	125	5	34	20	59	10	61	**15**	86	**46**	116	**42**	**204**	474
05:45 PM	2	80	30	112	**11**	37	28	76	**23**	**73**	12	**108**	36	105	26	167	463
Total Volume	67	340	120	527	32	146	102	280	70	252	39	361	160	450	113	723	1891
% App. Total	12.7	64.5	22.8		11.4	52.1	36.4		19.4	69.8	10.8		22.1	62.2	15.6		
PHF	.508	.924	.909	.867	.727	.961	.823	.909	.761	.863	.650	.836	.870	.872	.673	.886	.969